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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Kazumasa Ikushima

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03/31/2008

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EXAMINER

LEGESSE, HENOK D

ART UNIT

PAPER NUMBER

2861

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/565,504	IKUSHIMA, KAZUMASA	
	<b>Examiner</b>	<b>Art Unit</b>	
	HENOK LEGESSE	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)                          |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application                |
| Paper No(s)/Mail Date _____  | 6) <input checked="" type="checkbox"/> Other: <u>1 Foreign (Japan) Reference</u> |

## **DETAILED ACTION**

### **Acknowledgment**

1. The amendments made to the abstract and specification to overcome the objections made in the office action (07/26/2007) is accepted.

### ***Claim Objections***

2. Claims 2, 8, 9, and 10 are objected to because of the following informalities: in claims 2, 9, line 2, the term “plunder” is a misspelled term and should be corrected as “plunger”; in claim 8, lines 1-2, and claim 10, line 2, the typing errors “disc harging”, “rota tion” and “plunge r” should be corrected as “discharging”, “rotation” and “plunger” respectively. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1- 3, and 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suovaniemi et al.(US 5,343,769) in view of Fischer (US 6,283,946).

**Regarding claim 1**, Suovaniemi et al teaches a method of discharging a liquid droplet comprising:

providing a liquid discharging apparatus (device in figs.1, 2, 4) comprising:

a metering tube (6 in fig.2) having a discharge port communicating to outside (fig.2), and

a plunger (4) which is in close contact with the inner wall surface of the metering tube (6)(see in fig.2);

moving forward and stopping the plunger (4) sliding while closely contacting with an inner wall face of the metering tube (6), thereby discharging the liquid material in the metering tube (6) from the discharge port adjusted over a plurality of times (controller 13 controls the movement of plunger 4 in such a way that a predetermined amount of liquid is dispensed over times. See figs.2-4; col.4, lines 36-68; col.5, lines 1-3); and

controlling moving speed (using the controller 13 in fig.4) of the plunger (4, fig.2) from a start of the deceleration to a stop of the plunger (4) in the step of moving forward and stopping the plunger (4) such that a discharge quantity of the liquid droplet discharged from the discharge port becomes constant at every discharge (fig.5; col.5, lines 47-50, 59-68 during liquid dispensing initially the driving motor 8 is accelerated over time thereby the plunger 4, step A, up to a desired level B and this level B is maintained over a period of time up to point C at this point the motor 8 decelerates thereby the plunger 4 until the plunger stops over given time as shown in fig.5).

Suovaniemi et al teaches the plunger (4) is in close contact with the inner wall surface of the metering tube (6), However, he does not specifically teaches the tip face of the plunger closely contacts with the inner wall surface of the metering tube.

Fischer teaches a plunger (250, figs.7A, 7B) whose tip face closely contacts the inner wall surface of the metering tube (220). A sealing gasket (260) is arranged on the tip portion of the plunger (250) to improve the closeness of the plunger tip to the inner surface of the tube (220).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the sealing gasket of Fischer on the tip portion of the plunger of Suovaniemi et al in order to improve the closeness of the plunger to the inner surface of the tube thereby improving the efficiency of the dispensing device, since air and/or liquid is hindered from passing between the inner surface of tube and the plunger.

**Regarding claim 2,** Fischer further teaches air bubble removing means, air vent, can be provided in the plunger to vent out trapped air bubbles (col.13, lines 6-8).

**Regarding claim 3,** Suovaniemi et al further teaches the liquid droplet discharged /dispensed by the method of claims 1 or 2 above, inherently is dispensed on a droplet receiving element/body/work.

**Regarding claim 5**, Suovaniemi et al as modified by Fischer above further teaches an apparatus (device in figs.1, 2, 4 of Suovaniemi et al) for discharging a liquid material, comprising:

a metering tube (6 in fig.2 of Suovaniemi et al) having a discharge port communicating to outside (fig.2);

a plunger (4 of Suovaniemi et al as modified by the sealing gasket of Fischer) whose tip face closely contacts an inner wall surface of the metering tube (6 in fig.2 of Suovaniemi et al), and

a control means (controller 13 in fig.4) controlling an operation of the plunger (4) sliding while closely contacting with an inner wall face of the metering tube (6), thereby discharging the liquid material in the metering tube (6) from the discharge port over a plurality of times (controller 13 controls the movement of plunger 4 in such a way that a predetermined amount of liquid is dispensed over times. See figs.2-4; col.4, lines 36-68; col.5, lines 1-3), wherein the control means (13 in fig.4) controls a moving speed of the plunger (4) moving from a start of a deceleration to a stop of the plunger (4) in the step of moving forward and stopping the plunger (4) such that a discharge quantity of the liquid droplet discharged from the discharge port becomes constant at every discharge (see fig.5; col.5, lines 47-50 and lines 59-68).

**Regarding claim 6**, Suovaniemi et al as modified by Fischer above further teaches input means (detector 14 in fig.4 which includes sensors 23 and 24 in fig.3 of Suovaniemi et al) indicating the moving speed of the plunger (4 in fig.2, col.4, lines 40-

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44) moving forward from start of deceleration to stop to the control means (13 in fig.4) (detector 14 including sensors 23,24 measures the position and / or movement of plunger 14, col.3 lines 59-61. see also figs.4, 5 and the corresponding text).

**Regarding claim 7**, Suovaniemi et al as modified by Fischer above further teaches the control means (13, in fig.4 of Suovaniemi et al) controls the operation of the plunger (4 in fig.2) on the basis of data concerning the moving speed of the plunger (4) moving forward from start of deceleration to stop, which has been inputted by the input means (14, 23, 24 figs.3, 4) (col.4, lines 18-68).

**Regarding claims 8 and 10**, Suovaniemi et al as modified by Fischer above further teaches wherein the plunger (4 in fig.2 of Suovaniemi et al) is moved by a motor (electric motor 8, fig.3) and controlling moving speed of the plunger (4) by controlling a rotation of operation of the motor (8) (see fig.4, and the corresponding text).

**Regarding claim 9**, Suovaniemi et al as modified by Fischer above further teaches wherein the plunger (4 in fig.2 of Suovaniemi et al) having an air bubble removing means (plunger 4 of Suovaniemi et al as modified by the air vent of Fischer, see the rejection of claim 2 above).

5. Claims 1-3, 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suovaniemi et al.(US 5,343,769) in view of Ikushima (JP2003126750).

**Regarding claim 1**, Suovaniemi et al teaches a method of discharging a liquid droplet comprising:

providing a liquid discharging apparatus (device in figs.1, 2, 4) comprising:

a metering tube (6 in fig.2) having a discharge port communicating to outside (fig.2), and

a plunger (4) which is in close contact with the inner wall surface of the metering tube (6)(see in fig.2);

moving forward and stopping the plunger (4) sliding while closely contacting with an inner wall face of the metering tube (6), thereby discharging the liquid material in the metering tube (6) from the discharge port adjusted over a plurality of times (controller 13 controls the movement of plunger 4 in such a way that a predetermined amount of liquid is dispensed over times. See figs.2-4; col.4, lines 36-68; col.5, lines 1-3); and

controlling moving speed (using the controller 13 in fig.4) of the plunger (4, fig.2) from a start of the deceleration to a stop of the plunger (4) in the step of moving forward and stopping the plunger (4) such that a discharge quantity of the liquid droplet discharged from the discharge port becomes constant at every discharge (fig.5; col.5, lines 47-50, 59-68 during liquid dispensing initially the driving motor 8 is accelerated over time thereby the plunger 4, step A, up to a desired level B and this level B is

maintained over a period of time up to point C at this point the motor 8 decelerates thereby the plunger 4 until the plunger stops over given time as shown in fig.5).

Suovaniemi et al teaches the plunger (4) is in close contact with the inner wall surface of the metering tube (6), However, he does not specifically teaches the tip face of the plunger closely contacts with the inner wall surface of the metering tube.

Ikushima teaches a plunger (plunger rod 11, plunger head 12 infig.4) whose tip face closely contacts the inner wall surface of the metering tube (2). A sealing member (13) is arranged on the plunger head (12) to improve the closeness of the plunger head portion (12) to the inner surface of the tube (2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the sealing member of Ikushima on the tip portion of the plunger of Suovaniemi et al in order to improve the closeness of the plunger to the inner surface of the tube thereby improving the efficiency of the dispensing device, since air and/or liquid is hindered from passing between the inner surface of tube and the plunger.

**Regarding claim 2,** Ikushima further teaches a plunger (11,12 fig.4) having an air bubble removing means (14).

**Regarding claim 3,** Suovaniemi et al further teaches the liquid droplet discharged /dispensed by the method of claims 1 or 2 above is inherently dispensed on a droplet receiving element/body/work.

**Regarding claim 5**, Suovaniemi et al as modified by Ikushima above further teaches an apparatus (device in figs.1, 2, 4 of Suovaniemi et al) for discharging a liquid material, comprising:

a metering tube (6 in fig.2 of Suovaniemi et al) having a discharge port communicating to outside (fig.2);

a plunger (4 of Suovaniemi et al as modified by the sealing member of Ikushima) whose tip face closely contacts an inner wall surface of the metering tube (6 in fig.2 of Suovaniemi et al), and

a control means (controller 13 in fig.4) controlling an operation of the plunger (4) sliding while closely contacting with an inner wall face of the metering tube (6), thereby discharging the liquid material in the metering tube (6) from the discharge port over a plurality of times (controller 13 controls the movement of plunger 4 in such a way that a predetermined amount of liquid is dispensed over times. See figs.2-4; col.4, lines 36-68; col.5, lines 1-3), wherein the control means (13 in fig.4) controls a moving speed of the plunger (4) moving from a start of a deceleration to a stop of the plunger (4) in the step of moving forward and stopping the plunger (4) such that a discharge quantity of the liquid droplet discharged from the discharge port becomes constant at every discharge (see fig.5; col.5, lines 47-50 and lines 59-68).

**Regarding claim 6**, Suovaniemi et al as modified by Ikushima above further teaches input means (detector 14 in fig.4 which includes sensors 23 and 24 in fig.3 of

Suovaniemi et al) indicating the moving speed of the plunger (4 in fig.2, col.4, lines 40-44) moving forward from start of deceleration to stop to the control means (13 in fig.4) (detector 14 including sensors 23,24 measures the position and / or movement of plunger 14, col.3 lines 59-61. see also figs.4, 5 and the corresponding text).

**Regarding claim 7**, Suovaniemi et al as modified by Ikushima above further teaches the control means (13, in fig.4 of Suovaniemi et al) controls the operation of the plunger (4 in fig.2) on the basis of data concerning the moving speed of the plunger (4) moving forward from start of deceleration to stop, which has been inputted by the input means (14, 23, 24 figs.3, 4) (col.4, lines 18-68).

**Regarding claims 8 and 10**, Suovaniemi et al as modified by Ikushima above further teaches wherein the plunger (4 in fig.2 of Suovaniemi et al) is moved by a motor (electric motor 8, fig.3) and controlling moving speed of the plunger (4) by controlling a rotation of operation of the motor (8) (see fig.4, and the corresponding text).

**Regarding claim 9**, Suovaniemi et al as modified by Ikushima above further teaches wherein the plunger (4 in fig.2 of Suovaniemi et al) having an air bubble removing means (plunger 4 of Suovaniemi et al as modified by the air bubble removing hole 14 of Ikushima, see the rejection of claim 2 above).

***Response to Arguments***

6. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HENOK LEGESSE whose telephone number is (571)270-1615. The examiner can normally be reached on Mon - FRI, 7:30-5:00, ALT.FRI EST.TIME.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

H.L.  
03/24/2008

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